Space Weather Forecast

Issued on Wednesday, 03 January 2024 at 01:25 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate flares likely with a slight chance of isolated Strong flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate with one small Moderate flare observed from the complex region in the northeast. This continues to be the main region of note, although remains small with some degree of weakening having occurred. This can be seen with the main spot separating into distinct regions with opposite magnetic polarities no longer being within the same spot. This remains a complex region however, with a number of small spots of varying polarities following this main spot. There are a total of four sunspot regions on the disc, with the other three all smaller and simpler with no significant growth observed.

A number of coronal mass ejections (CMEs) were visible in imagery, however these have all been assessed as being off the Earth-Sun line with no Earth-directed CMEs occurring.

Solar Wind / Geomagnetic: Solar winds were indicative of a weak fast wind from a coronal hole. Speeds were slightly elevated at 400-450 km/s. Interplanetary Magnetic Field (IMF), declined from initially moderate to be mainly weak. The north-south component was initially moderate southward, but soon became mainly positive (northward). Geomagnetic activity was Quiet to Unsettled (Kp1-3).

Energetic Particles / Solar Radiation: Count rate of energetic particles (high energy protons) was mostly at background, though a minor response to the strong flare on 31 Dec was observed and is ongoing but remained below the S1 Minor Radiation Storms level, albeit with a recent rising trend.

Four-Day Space Weather Forecast Summary

Solar Activity: The complex region in the northeast dominates the flare risk during the forecast period. Generally Moderate activity is expected, with a slight chance of further isolated Strong flares.

Solar Wind / Geomagnetic Activity: The strong flare appears likely to have missed, however there remains a chance of a glancing arrival early on day 1 (03 Jan). Further weak CMEs from 30-31 Dec also have the potential to give a glancing enhancements on day 1-2 (03-04 Jan), however any influence from these is expected to be minimal. Current fast winds are expected to continue days 1-2 (03-04 Jan), before easing to background days 3-4 (05-06 Jan). No other enhancements are forecast. Quiet geomagnetic activity is expected for much of the period, with a decreasing chance of isolated Unsettled spells. Any CME influence will bring a chance of Active intervals, with a very slight chance of G1 Minor Storms, mainly if any influence of the X5.0 CME is observed early day 1 (03 Jan).

Energetic Particles / Solar Radiation: Count rate of energetic particles (high energy protons) may continue to rise for a time day 1, or in response to any notable flares, more likely later in the period. This brings a slight chance of approaching, perhaps breaching the S1 Minor Radiation Storm level.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	15	5	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	60	60
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	5	5	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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